

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

Listing of Claims

Claims 1-8 (Canceled)

Claim 9 (Currently amended): A method of producing a grid for a battery electrode plate, comprising the steps a-step of:

providing a sheet to become the grid for the battery electrode plate;
providing forming a grid from a sheet by a rotary expander[[], and
forming the grid from the sheet by the rotary expander, wherein said rotary expander comprises [:] a disk cutter cluster comprising:

a first disk cutter roll having a first middle disk cutter;
a second disk cutter roll having a second middle disk cutter, the first disk
cutter roll and the second disk cutter roll being a pair of disk cutter rolls;
a middle disk cutter disposed in each of said disk cutter rolls;
an edge disk cutter disposed at an outermost end at an edge of said disk
cutter cluster; wherein the edge disk cutter comprises;
a first face facing the second middle disk cutter;
a second face opposite to the first face;

~~a notch provided at the periphery of said edge disk cutter and penetrating said edge disk cutter in the thickness direction of said edge disk cutter;~~

~~ridges a ridge disposed at a [[the]] periphery of said edge disk cutter, wherein a notch is interposed between the ridges being adjacent, wherein the notch is provided at the periphery of said edge disk cutter by penetrating said edge disk cutter in the thickness direction of said edge disk cutter; and~~

~~an inclined surface provided on the second face of the ridges of said edge disk cutter that contacts with said ridge at least at a part of contact with said notch, and, wherein said notch is provided to serve as formed at an edge node forming part.~~

Claim 10 (Currently amended): The method of producing a grid for a battery electrode plate according to Claim 9,

wherein each of said ridges ~~ridge protrudes~~ by 30% or greater of the thickness of said sheet from a reference plane of said disk cutter cluster.

Claim 11 (Currently amended): The method of producing a grid for a battery electrode plate according to Claim 10,

wherein each of said ridges protrude ridge protrudes by 70% or greater of the thickness of said sheet from said reference plane.

Claim 12 (Currently amended): The method of producing a grid for a battery electrode plate according to Claim 9,

wherein the height of protrusion of each of said ridges from a reference plane of said disk cutter cluster is 110% or less of the thickness of said sheet.

Claim 13 (Currently amended): The method of producing a grid for a battery electrode plate according to Claim 9,

wherein a bottom part of said notch is positioned on the second side of a disk cutter roll equipped with said edge disk cutter against a reference plane of said disk cutter cluster.

Claims 14-15 (Canceled)

Claim 16 (Currently amended): A method of producing a lead-acid battery, comprising the steps of: ~~a step of using a grid for a battery electrode plate, wherein~~ providing a sheet to become a grid for a battery electrode plate; providing said grid is formed from a sheet by a rotary expander [[:]] ; and forming the grid from the sheet by the rotary expander, wherein said rotary expander comprises [[:]] a disk cutter cluster comprising:

a first disk cutter roll having a first middle disk cutter;
a second disk cutter roll having a second middle disk cutter, the first disk
cutter roll and the second disk cutter roll being a pair of disk cutter rolls;
a middle disk cutter disposed in each of said disk cutter rolls;
an edge disk cutter disposed at an outermost end at an edge of said disk
cutter cluster; wherein the edge disk cutter comprises
 a first face facing the second middle disk cutter;
 a second face opposite to the first face;
 a notch provided at the periphery of said edge disk cutter
 and penetrating said edge disk cutter in the thickness direction of
 said edge disk cutter;
 ridges a ridge disposed at a [[the]] periphery of said edge
 disk cutter, wherein a notch is interposed between the ridges being
 adjacent, wherein the notch is provided at the periphery of said
 edge disk cutter by penetrating said edge disk cutter in the
 thickness direction of said edge disk cutter; and
 an inclined surface provided on the second face of the
 ridges of said edge disk cutter that contacts with said ridge at least
 at a part of contact with said notch, and, and wherein said notch is
 provided to serve as formed at an edge node forming part.

Claim 17 (Currently amended): The method of producing a lead-acid battery according to

Claim 16,

wherein each of said ridges protrude ~~ridge protrudes~~ by 30% or greater of the thickness of said sheet from a reference plane of said disk cutter cluster.

Claim 18 (Currently amended): The method of producing a lead-acid battery according to

Claim 17,

wherein each of said ridges protrude ~~ridge protrudes~~ by 70% or greater of the thickness of said sheet from said reference plane.

Claim 19 (Currently amended): The method of producing a lead-acid battery according to

Claim 16,

wherein the height of protrusion of each of said ridges ~~ridge~~ from a reference plane of said disk cutter cluster is 110% or less of the thickness of said sheet.

Claim 20 (Currently amended): The method of producing a lead-acid battery according to

Claim 16,

wherein a bottom part of said notch is positioned on the second side ~~of~~ a disk cutter roll equipped with said edge disk cutter against a reference plane of said disk cutter cluster.

Claims 21-22 (Canceled)

Claim 23 (Withdrawn): An apparatus for producing a grid for a battery electrode plate comprising:

 a disk cutter cluster comprising a pair of disk cutter rolls;
 a middle disk cutter disposed in each of said disk cutter rolls;
 an edge disk cutter disposed at an edge of said disk cutter cluster;
 a notch provided at the periphery of said edge disk cutter and penetrating said edge disk cutter in the thickness direction of said edge disk cutter;
 a ridge disposed at the periphery of said edge disk cutter; and
 an inclined surface of said edge disk cutter that contacts with said ridge at least at a part of contact with said notch,
 wherein said notch is formed at an edge node forming part.

Claims 24-25 (Canceled)

Claim 26 (Withdrawn): The apparatus for producing a grid for a battery electrode plate according to Claim 23,

 wherein said ridge protrudes by 30% or greater of the thickness of said sheet from a reference plane of said disk cutter cluster.

Claim 27 (Withdrawn): The apparatus for producing a grid for a battery electrode plate according to Claim 26,

wherein said ridge protrudes by 70% or greater of the thickness of said sheet from said reference plane.

Claim 28 (Withdrawn): The apparatus for producing a grid for a battery electrode plate according to Claim 23,

wherein the height of protrusion of said ridge from a reference plane of said disk cutter cluster is 110% or less of the thickness of said sheet.

Claim 29 (Withdrawn): The apparatus for producing a grid for a battery electrode plate according to Claim 23,

wherein a bottom part of said notch is positioned on the side of a disk cutter roll equipped with said edge disk cutter against a reference plane of said disk cutter cluster.